Symmetry-protected gates of Majorana qubits in a higher-order topological superconductor

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We will first review the idea of manipulating Majorana non-Abelian anyons for topological quantum computation, and then introduce the concept of higher-order topological superconductors. We show that higher-order topological superconductors naturally host Majorana modes at the corners and hinges of the sample. We discuss several possible realizations of higher-order topological super- conductors, and in one setup, we show that the Majorana modes can be manipulated for braiding processes by tuning a Zeeman field. We show that such a setup can achieve full braiding, exchang- ing, and a long-saught-after Magic gate of the Majorana zero modes, providing a new route toward topological quantum computation.